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FORMERLY UTILIZED SITES PROGRAM
PROGRAM INELIGIBILITY REPORT FOR THE
MARION MILL SITE, BOULDER, COLORADO

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Introduction and Summary

An investigation of a former mill site in Boulder, Colorado, known as the Marion Mill Site, Wah Chang Mill and Sweeney Mill, was completed to provide input to DOE to determine if the site qualified as a FUSRAP site. In general, the investigation concluded that while the site contains uranium and thorium bearing residue with radiation levels and concentrations of radionuclides probably in excess of FUSRAP guidelines, the residue is not the result of MED or AEC operations. No evidence was identified which connects the Marion Mill operations with MED/AEC operations. Furthermore, the site is currently licensed by the State of Colorado.

Reason for Investigation

This site was identified as a possible FUSRAP site by the State of Colorado. The State suggested that materials (thorium concentrates) produced at the site during 1957 and 1958, when the site was operated by Wah Chang Corporation, were produced for AEC and, as a result, the site should at least be partially decontaminated at the expense of the Government. Colorado attempted to support their contention and request for inclusion with the following statements:

- Wah Chang shipped the thorium concentrates to Davison Chemical in Maryland (a known AEC thorium processer).
- AEC owned all source material and was the only purchaser of thorium during the period.

The factualness of both of these statements will be addressed later in this report.

Background on Marion Mill Site

In 1954, the Wah Chang Corporation of New York, New York, assumed control of the mill and properties of the Boulder Tungsten Mines, Inc. On November 1, 1956, the Government terminated its tungsten ore buying program* which resulted in essentially a complete shutdown of all tungsten operations. Late in 1957 Wah Chang Corporation began treating thorium ore (thorite) from the Canon City area and, in 1958, some concentrations were shipped to Davison Chemical Division in Curtis Bay, Maryland ,for further processing. In 1958, Wah Chang ceased processing operations and in 1959 sold the facility. It was estimated that Wah Chang processed about 7000 tons of ore and produced 20,000 lbs of ThO_2 product (50 percent efficiency). The new owners (Sweeney, et al.) made some processing changes to allow for processing of "custom" ore from Ceder Creek County.

AEC license records indicate the owners of the mill applied for a license to commercially process source material (residue containing uranium and thorium) in 1962. License No. SUA-724 was issued on September 16, 1963, for storage of source material. The license was modified November 4, 1963, to include processing. It was noted in AEC inspection reports that the owners were processing source material approximately two years before they applied for a license. The licensee continued to process source material in the period following issuance of a source material storage only license and before the modification of the license to include processing was implemented. No citation was recommended because the owner was being cooperative and was willing to correct all noncompliance areas.

In 1964, the mill was sold to the F.H. Lenway Corporation of San Francisco, California. All material on the site containing source material processed before July 1, 1964, remained the property of Mr. Sweeney. Residues owned by

*This program was part of the government effort to enhance production of certain critical materials and was not AEC related.

Mr. Sweeney continued to be covered under SUA-724 and, on November 6, 1967, SUA-774 was issued to cover Lenway operations. Under Lenway, the facility continued to process uranium- and thorium-bearing residues for the commercial market.

The site is presently owned and licensed to Sweeney Mining and Milling and maintained under Colorado Licence 149-01-S. The State of Colorado has indicated that residues are present on the site that contain thorium or uranium in licensable concentrations and that the residues from the Wah Chang operations are a significant problem.

Analysis

Intensive records searches were conducted to determine whether a connection existed between Wah Chang thorium processing and the AEC. No contracts or connections were identified. Indirect connections through W.R. Grace Davison Chemical Division were investigated through records searches and interviews with current and former W.R. Grace employees. W.R. Grace or their predecessors were involved with two AEC contracts for feed materials, Contract AT(30-1)-1037 and AT(49-6)-993. The first contract was closed out prior to the initiation of the Wah Chang operation, and the second was for processing of AEC-owned monazite sands. It is more likely that concentrations received by W.R. Grace from Wah Chang were processed for commercial sale rather than AEC sale.

It is not possible, as suggested by Colorado, to generally assume all thorium production was for AEC. Non-energy thorium oxide consumption for the years 1957 through 1960 totalled about 760,000 lbs. In addition, thorium was also consumed for commercial energy development. W.R. Grace was one of the few commercial companies capable of producing reactor grade thorium. The company produced thorium for both the energy and non-energy commercial sector in addition to their AEC related work. For instance, in 1960 W. R. Grace produced high-purity thorium for the advance epithermal thorium reactor in California. The reactor was being constructed by the Atomic International

Division of North American Aviation Corporation for the Southwest Atomic Energy Associates, a group of privately-owned electric companies.

It is also not true that all source material in 1957 to 1959 was owned by the Federal government due to Federal statute and regulation.

Atomic energy was first regulated under Federal legislation with the promulgation of the Atomic Energy Act of 1946 (AEA). Its primary purpose was to ensure that the development of atomic energy was conducted in a manner consistent with the security of the United States. To this end, Congress gave the Federal government control of the production and use of fissionable material and vested this control in the AEC, established by the Act. AEA was amended in 1954 to encourage private enterprise to develop and utilize atomic energy for peaceful purposes. These amendments allowed non-Federal ownership of nuclear production and utilization facilities provided an operating license was obtained from AEC. The amendments also authorized private ownership of by-product material and the leasing of special nuclear material by AEC licensed enterprises.

The effect of the 1954 amendments was to remove the monopolistic Government control over atomic energy development and utilization provided that private enterprise complied with all the requirements in AEC's licensing scheme. These amendments provide for Federal regulation over processing and use of source, by-product, and special nuclear material through comprehensive licensing processes.

In 1959, the AEA was further amended by adding a new section to (1) define the respective responsibilities of the states and the Commission regarding control of source, by-product, and special nuclear materials; (2) establish an orderly regulatory system between the states and AEC to regulate radiation hazards associated with the use of these materials, and (3) establish procedures for the transfer of AEC regulatory responsibilities to the states upon approval of a state program. In 1964, Congress amended the AEA by adding a new section allowing private ownership of special nuclear material by AEC licensees.

Under AEA, the Commission had the right to "purchase, take, requisition, condemn, or otherwise acquire supplies of source materials" or "deposits of source material" if such action was necessary "in the interest of common defense and security" and assuming "just compensation" is made for such property. However, it was not absolutely necessary for AEC to purchase the material.

Radiological Conditions

Based upon licensing records and information from the State of Colorado, residues remaining on the site probably contain radionuclides or are resulting in radiation levels that are sufficiently above background to warrant the site be considered for a radiological survey, if it were eligible for FUSRAP. However, because no DOE authority has been defined, no detailed analysis of radiological conditions was completed or recommended.

Factors Required for Inclusion

During records searches and analyses to support DOE determinations regarding authority for remedial action, the need for and pertinence of specific materials are assessed considering five questions addressed by DOE in an authority review. The questions and a summary of the implications of the data collected to date are discussed below.

1. Was the site/operation owned by a DOE predecessor or did a DOE predecessor have significant control over the operations or site?

   DOE predecessor agencies neither owned nor controlled this site.

2. Was a DOE predecessor agency reponsible for maintaining or ensuring the public health and safety, and the environment of the site (i.e., were they responsible for cleanup)?

   No DOE predecessor agency was responsible for maintaining the health and safety of the site. After 1962, AEC issued a license to the site owner and operator. AEC overviewed the operation to verify that the licensee was complying with the law and maintaining proper control of the source material. Responsibility for this overview was transferred to the State of Colorado when it became an agreement State.

3. Is the waste, residue, or radioactive material on the site the result of DOE predecessor related operations?

   There is no data to indicate materials on the site were related to DOE predecessor operations. All materials appear to have been produced for commercial sale to other refining companies. The final use or sale of the products from the other companies is unknown.

4. Is the site in need of further clean up and was the site left in unacceptable condition as a result of DOE predecessor related activity?

   The site was not left in unacceptable condition as a result of DOE predecessor activity. The need for further cleanup would have to be assessed by the appropriate regulatory agency within the State of Colorado.

5. Did the present owner accept responsibility for the site with knowledge of its contaminated condition and that additional remedial measures would be needed to make the site acceptable for nonrestricted use by the general public?

   There is insufficient data to evaluate this issue. The question is probably not applicable to this site.